

CLAIMS

What is claimed is:

1 1. A method of
2 embedding a watermark in a data set,
3 processing the data using some parameter set,
4 determining presence of data corruption of the data set with respect to an original data set
5 by measuring the amount of a recovered watermark, and
6 adjusting the parameter set for the data processing based on the presence of data
7 corruption.

1 2. The method of claim 1, further comprising processing the data set by transform encoding
2 the data set.

1 3. The method of claim 1, further comprising processing the data set by packetizing and
2 transmitting the data set.

1 4. The method of claim 1, further comprising identifying image frame errors in packet
2 transmitted audiovisual data sets.

1 5. The method of claim 1, wherein adjusting the parameter set further comprises modifying
2 network bandwidth to compensate for data corruption of the data set.

1 6. The method of claim 1, wherein determining presence of data corruption further
2 comprises quantitatively measuring spatial extent of corruption of image data sets.

1 7. The method of claim 1, wherein determining presence of data corruption further
2 comprises quantitatively measuring temporal duration of corruption of data sets.

1 8. An article comprising a computer readable medium to store computer executable
2 instructions, the instructions defined to cause a computer to

3 embed a watermark in a data set,
4 process the data using some parameter set,
5 determine presence of data corruption in the data set with respect to an original data set
6 by measuring the amount of a recovered watermark, and
7 adjust the parameter set for the data processing based on the presence of data corruption.

1 9. The article comprising a computer readable medium to store computer executable
2 instructions of claim 8, wherein the instructions further cause a computer to process the data set
3 by transform encoding the data set.

1 10. The article comprising a computer readable medium to store computer executable
2 instructions of claim 8, wherein the instructions further cause a computer to process the data set
3 by packetizing and transmitting the data set.

1 11. The article comprising a computer readable medium to store computer executable
2 instructions of claim 8, wherein the instructions further cause a computer to identify image frame
3 errors in packet transmitted audiovisual data sets.

1 12. The article comprising a computer readable medium to store computer executable
2 instructions of claim 8, wherein the instructions further cause a computer to adjust the parameter
3 set by modifying network bandwidth to compensate for data corruption of the data set.

1 13. The article comprising a computer readable medium to store computer executable
2 instructions of claim 8, wherein the instructions further cause a computer to determine presence
3 of data corruption by quantitatively measuring spatial extent of corruption of image data sets.

1 14. The article comprising a computer readable medium to store computer executable
2 instructions of claim 8, wherein the instructions further cause a computer to determine presence
3 of data corruption by quantitatively measuring temporal duration of corruption of data sets.

- 1 15. A data degradation measurement system comprising
2 a watermarking module to embed a recoverable watermark in a data set,
3 a processing module for modifying the data using some parameter set, and
4 a watermark recovery module to determine presence of data corruption of the data set
5 with respect to an original data set by measuring the amount of a recovered watermark.
- 1 16. The method of claim 15, wherein the processing module further comprises a transform
2 encoding processor to process the data set by transform encoding the data set.
- 1 17. The method of claim 15, wherein the processing module further comprises a packetizer to
2 process the data set by packetizing and transmit the data set.
- 1 18. The method of claim 15, wherein the watermark recovery module further detects image
2 frame errors in packet transmitted audiovisual data sets.
- 1 19. The method of claim 15, wherein the processing module adjusts the parameter set by
2 modifying network bandwidth to compensate for data corruption of the data set.
- 1 20. The method of claim 15, wherein the watermark recovery module quantitatively measures
2 spatial extent of corruption of image data sets.
- 1 21. The method of claim 15, wherein the watermark recovery module quantitatively measures
2 temporal duration of corruption of data sets.
- 1 22. The method of claim 15, further comprising a back channel transmitter to communicate
2 information to the processing module to adjust the parameter set for the data processing based on
3 the presence of data corruption detected by the watermark recovery module.
- 1 23. A method of
2 receiving an embedded watermark in a data set,

3 determining quality of the received data set with respect to an original data set by
4 measuring the amount of a recovered watermark, and
5 adjusting determined billing value of the received data set based on the determined
6 quality.

1 24. The method of claim 23, wherein adjusted billing value is partitioned between a content
2 provider and a service provider.

1 25. The method of claim 23, wherein the data set is provided by a content encoder, and
2 wherein the determined quality of the received data set is transmitted to the content encoder to
3 permit encoding adjustments.

1 26. The method of claim 23, wherein the data set is transmitted by a service provider, and
2 wherein the determined quality of the received data set is transmitted to the service provider to
3 permit quality of service adjustments.

1 27. The method of claim 23, wherein the determined quality of the received data set is used to
2 drop data frames from playback having less than a predetermined quality level.

1 28. A method of
2 embedding a watermark in a data set to allow reception-side determination of quality of
3 the data set with respect to an original data set by measuring the amount of a recovered
4 watermark,
5 transmitting the data set having the embedded watermark, and
6 accepting information about determined quality of the transmitted data set and adjusting
7 at least one of a data encoding parameter or transmission parameter in response for later
8 transmitted data.

1 29. A method of
2 embedding a watermark in an original data set,

3 transmitting the data set having the embedded watermark over a packet based network to
4 a receiver,
5 determining quality of the received data set with respect to the original data set by
6 measuring the amount of a recovered watermark, and
7 adjusting determined billing value of the received data set based on the determined
8 quality with respect to the original data set.

Exhibit A-1